

REMARKS

Claims 1, 6, 12-13, 15-16 and 22-23 are amended; claims 24-35 are cancelled. Claims 1-23 are pending, of which claims 1, 12, 15 and 16 are independent claims.

In the Office Action, claims 12-15 are rejected under 35 U.S.C. § 112, 2nd para. These claims are amended to address these rejections. Specifically, claims 12 and 15 are re-written into independent form so that there is no issue regarding proper form of an dependent claim. It is noted that the Office Action also makes statements about lack of clarity and conciseness, but there is no specific language of the claims which is identified. If there should still be any issue of lack of clarity or conciseness in these claims as amended, it is respectfully requested that a subsequent Office Action identify the problematic language so that Applicant has a clearer understanding and can take appropriate corrective action.

In the Office Action, claims 1-23 are rejected under 35 USC 103(a) as being unpatentable over Seal ('438) further supported by Duret ('612). This rejection is respectfully traversed.

Claim 1 recites a radio frequency receiver for use in a proximity detecting system that operates in the low radio frequency range. The radio frequency receiver comprises at least one antenna coil operable to receive radio frequency signals; tunable receiver circuitry arranged in operative association with the at least one antenna coil and being arranged to modify the frequency at which radio signals are received by the radio frequency receiver; a signal processor arranged to amplify and filter signals received by the radio frequency receiver; and a processing system arranged to receive the filtered signals and determine proximity based on the signal strength of the at least one antenna coil. By operating in the low frequency range, multi-path problems associated with high frequency equipment (such as reflections from objects located between the path

of the transmitter and receiver) are significantly reduced, whilst distance between transmitter and receiver can be identified extremely accurately.

Seal discloses a system for determining the relative position of an RFID transponder within an area using a plurality of stationary sensors (c.f. abstract, field of invention). Each stationary sensor comprises a plurality of antenna coils arranged in a defined physical orientation and capable of transmitting radio frequency signals of differing phase. The transponder is operable to determine its position relative to the stationary sensors on the basis of signals received from said sensors (c.f. column 5, lines 15-18).

Each stationary sensor in Seal emits three phase shifted carrier waves using the respective three antenna coils (c.f. column 5, lines 18-21) which are typically arranged along one of the three Cartesian axes (c.f. column 5, lines 35-37). Given that the magnetic field intensity around each antenna coil varies as a function of position and time, this arrangement can be used to by the RFID tag to determine its position relative to the stationary sensors.

Figure 3 of Seal and the associated description at column 5 lines 43-60 discloses that in order for the transponder to determine its position, it must receive signals from at least two of the stationary sensors. The ratio of the signal strengths received by the transponder from the stationary sensors is used by the transponder to compute a positional angle (i.e. direction) relative to the known positions of the sensors. It is important to note it is a relative positional angle that is determined and that the transponder does not use signal strength to determine an absolute proximity to any one of the stationary sensors.

The algorithm by which the transponder determines its position relative to the stationary sensors is further described at column 15 line 36 to column 16 line 38 of Seal. This passage describes an algorithm whereby each of the stationary sensors transmits a sequence of messages using differing antenna combinations. Based on this passage and associated Figure 18, it will be apparent that determination of the transponder position requires active control of each of the sensors to select an appropriate antenna combination by which to

transmit messages to the transponder. Thus the principle by which the system disclosed in Seal determines the transponder's relative position is very different from the principle by which present invention determines proximity.

It is desired to address the specific interpretation of Seal and the mapping that is set forth in the Office Action between features of the system disclosed in Seal to the features of claim 1. In view of the above discussion, it appears that the Office Action presents a mapping of some features of claim 1 to the sensor disclosed in Seal, and other features to the transponder. Specifically, it is understood that the *"radio frequency receiver"* of claim 1 is mapped to the transponder disclosed in Seal at column 5 lines 58-60, while the *"at least one antenna coil"* and *"tunable receiver circuitry"* are mapped to aspects of the stationary sensors disclosed at column 5 lines 1-10, 18-22 & 32-39. Conversely, the *"signal processor"* and *"processing system"* features have been mapped to the communications processor 1406 of the transponder.

As described above, the stationary sensors disclosed in Seal do not determine distance between transponder and sensor and thus do not determine proximity of the transponder on the basis of any criterion, let alone on the basis of received signal strength. Accordingly, it is respectfully urged that mapping features of claim 1 to aspects residing in the stationary sensors disclosed in Seal is inappropriate on at least this basis. Regarding the transponder of Seal, the communications processor 1406 appears to be a digital processor providing CRC and ID code functionality, but does not appear to evaluate a signal strength associated with received signals. Thus, it is believed that at least the following features of claim 1 are novel over the transponder disclosed in Seal:

"a signal processor arranged to amplify and filter signals received by the radio frequency receiver;"

"a processing system arranged to receive radio signals amplified and filtered by the signal processor so as to evaluate a signal

strength associated with each said antenna coil, the processing system being arranged to evaluate a distance between a radio frequency transmitter and the radio frequency receiver on the basis of evaluated signal strengths associated with radio signals received by the at least one antenna coil;"

Turning now to Duret, this reference describes a system for measuring small changes in distance. The system comprises a fixed unit and a mobile unit, the mobile unit being a passive transponder that reflects signals broadcast by the fixed unit. The fixed unit broadcasts a field that is picked up by the mobile unit coil, generating a voltage in that coil that, in turn, creates a current in that coil. The system comprises means for measuring changes in distance in so far as the current in the coil of the mobile unit creates an opposing magnetic field in the fixed unit coil according to the principle of mutual inductance, with the result that its impedance changes. This change is "sensed" by the fixed unit coil – specifically, it is measured by the bridge detector circuit of the fixed unit. Thus the system does not have means for evaluating signal strength and therefore does not include means for evaluating distance between the fixed and mobile unit on the basis of signal strength.

In contrast to claim 1, Duret discloses determining distance between the fixed and mobile units on the basis of the variation of mutual coupling between the coil in the mobile unit and the coil in the fixed unit. The range of the system is dependent on mutual coupling between the coils and the sensitivity of the circuit to detect changes to this coupling, in so far as, the further the coils are separated, the weaker the coupling. As described in paragraphs 1 and 9 of Duret, the system can only work over very short distances, of the order a few centimeters.

Thus with respect to claim 1, Duret does not describe either a receiver being responsive to signal strength emanating from a transmitter or evaluating distance on the basis of the signal strength. Importantly, because of the

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mechanism used to measure distance (mutual inductance), the receiver in Duret is unable to evaluate signal strength.

In view of the above discussion it is clear that the receiver provided by claim 1 not described in Seal or Duret. Furthermore, a skilled person would not be minded to combine the teachings of Seal and Duret given that the relatively short measurable distances of Duret are of no practical use in the system of Seal. It is therefore respectfully urged that claim 1 is inventive over the prior art of record. Similar arguments apply, mutatis mutandis, in respect of the other independent claims 12, 15 and 16 and of course all the dependent claims.

Based on the amendments and remarks herein, it is respectfully urged that all the claims of this application are presently allowable. Favorable action is respectfully requested.

Respectfully submitted,

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Attorney Docket No.: 1009-003

Dated: July 22, 2010